

6BQ5–8BQ5

PENTODE

FOR AF POWER AMPLIFIER APPLICATIONS

DESCRIPTION AND RATING

The 6BQ5 is a power-amplifier pentode designed for use in the audio-frequency power-output stage of television and radio receivers and in high-fidelity amplifiers.

Except for heater ratings, the 8BQ5 is identical to the 6BQ5.

GENERAL

ELECTRICAL

Cathode—Coated Unipotential	6BQ5	8BQ5	
Heater Voltage, AC or DC	6.3	8.0	Volts
Heater Current	0.76	0.6	Amperes
Heater Warm-up Time*	....	11	Seconds
Direct Interelectrode Capacitances†			
Grid-Number 1 to Plate, maximum		0.5	μμf
Input		10.8	μμf
Output		6.5	μμf

MECHANICAL

Mounting Position—Any
Envelope—T-6½, Glass
Base—E9-1, Small Button 9-Pin

MAXIMUM RATINGS

DESIGN-CENTER VALUES

Plate Voltage	300	Volts
Screen Voltage	300	Volts
Negative DC Grid-Number 1 Voltage	100	Volts
Plate Dissipation	12	Watts
Screen Dissipation (Continuous)	2.0	Watts
Screen Dissipation (Peaks of Speech and Music)	4.0	Watts
DC Cathode Current	65	Milliamperes
Heater-Cathode Voltage		
Heater Positive with Respect to Cathode	100	Volts
Heater Negative with Respect to Cathode	100	Volts
Grid-Number 1 Circuit Resistance		
With Fixed Bias	0.3	Megohms
With Cathode Bias	1.0	Megohms

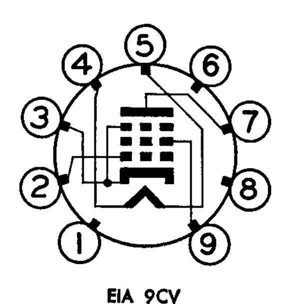
Design-Center ratings are limiting values of operating conditions applicable to a bogey tube of a specified type as defined by its published data, and should not be exceeded under normal conditions.

The tube manufacturer chooses these values to provide acceptable serviceability of the tube in average applications, taking responsibility for normal changes in operating conditions due to rated supply voltage variation (For an AC power source, 117 volts plus or minus 10% is accepted USA practice.), equipment component variation, equipment control adjustment, load variation, signal variation, environmental conditions, and variations in tube characteristics.

The equipment manufacturer should design so that initially no design-center value for the intended service is exceeded with a bogey tube in equipment operating at the stated normal supply voltage.



BASING DIAGRAM

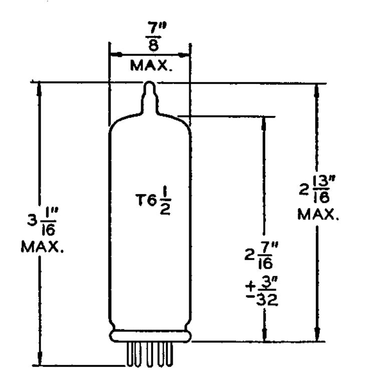


EIA 9CV

TERMINAL CONNECTIONS

Pin 1—Internal Connection
Pin 2—Grid Number 1
Pin 3—Cathode and Grid Number 3 (Suppressor)
Pin 4—Heater
Pin 5—Heater
Pin 6—Internal Connection
Pin 7—Plate
Pin 8—Internal Connection
Pin 9—Grid Number 2 (Screen)

PHYSICAL DIMENSIONS



EIA 6-4

CHARACTERISTICS AND TYPICAL OPERATION

AVERAGE CHARACTERISTICS

Plate Voltage	250	Volts
Screen Voltage	250	Volts
Grid-Number 1 Voltage	−7.3	Volts
Plate Resistance, approximate	40000	Ohms
Transconductance	11300	Micromhos
Plate Current	48	Milliamperes
Screen Current	5.5	Milliamperes
Amplification Factor (Grid-Number 1 to Grid-Number 2)	19.5	

CLASS A_1 AMPLIFIER

Plate Voltage	250	250	250	250	Volts
Screen Voltage	250	250	250	210	Volts
Grid-Number 1 Voltage	−7.3	−7.3	−8.4	−6.4	Volts
Peak AF Grid-Number 1 Voltage	6.1	6.2	4.95	4.8	Volts
Zero-Signal Plate Current	48	48	36	36	Milliamperes
Maximum-Signal Plate Current	49.5	50.6	36.8	36.6	Milliamperes
Zero-Signal Screen Current	5.5	5.5	4.1	3.9	Milliamperes
Maximum-Signal Screen Current	10.8	10	8.5	7.3	Milliamperes
Load Resistance	5200	4500	7000	7000	Ohms
Total Harmonic Distortion, approximate	10	10	10	10	Percent
Maximum-Signal Power Output	5.7	5.7	4.2	4.3	Watts

PUSH-PULL CLASS AB_1 AMPLIFIER, VALUES FOR TWO TUBES

Plate Voltage	250	300	Volts
Screen Voltage	250	300	Volts
Cathode-Bias Resistor	130	130	Ohms
Peak AF Grid-to-Grid Voltage	22.6	28.2	Volts
Zero-Signal Plate Current	62	72	Milliamperes
Maximum-Signal Plate Current	75	92	Milliamperes
Zero-Signal Screen Current	7.0	8.0	Milliamperes
Maximum-Signal Screen Current	15	22	Milliamperes
Effective Load Resistance, Plate-to-Plate	8000	8000	Ohms
Total Harmonic Distortion	3	4	Percent
Maximum-Signal Power Output	11	17	Watts

PUSH-PULL CLASS B AMPLIFIER, VALUES FOR TWO TUBES

Plate Voltage	250	300	Volts
Screen Voltage	250	300	Volts
Grid-Number 1 Voltage	−11.6	−14.7	Volts
Peak AF Grid-to-Grid Voltage	22.6	28.2	Volts
Zero-Signal Plate Current	20	15	Milliamperes
Maximum-Signal Plate Current	75	92	Milliamperes
Zero-Signal Screen Current	2.2	1.6	Milliamperes
Maximum-Signal Screen Current	15	22	Milliamperes
Effective Load Resistance, Plate-to-Plate	8000	8000	Ohms
Total Harmonic Distortion	3	4	Percent
Maximum-Signal Power Output	11	17	Watts

CLASS A_1 AMPLIFIER, TRIODE CONNECTION‡

Plate Voltage	250	Volts
Cathode-Bias Resistor	270	Ohms
Peak AF Grid-Number 1 Voltage	9.5	Volts
Zero-Signal Plate Current	34	Milliamperes
Maximum-Signal Plate Current	36	Milliamperes
Load Resistance	3500	Ohms
Total Harmonic Distortion, approximate	9	Percent
Maximum-Signal Power Output	1.95	Watts

CHARACTERISTICS AND TYPICAL OPERATION (Continued)

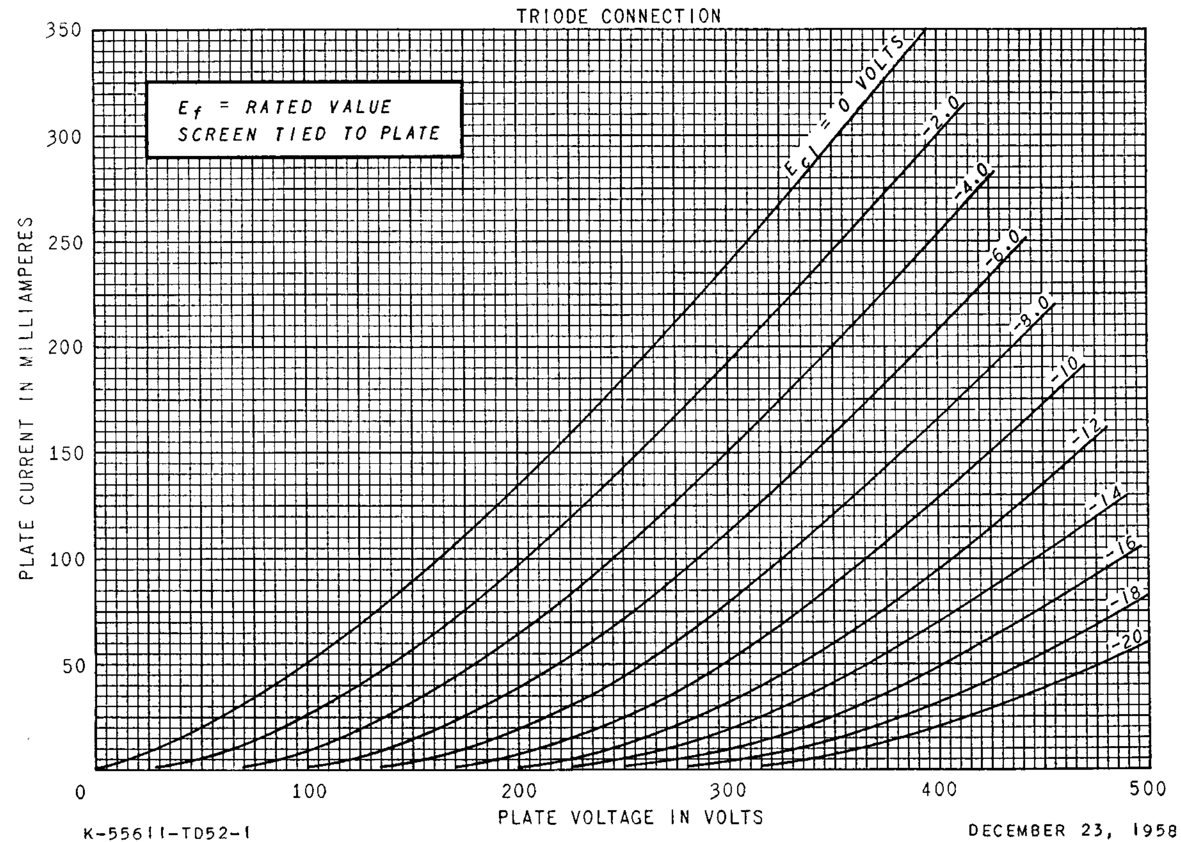
PUSH-PULL CLASS AB_1 AMPLIFIER TRIODE CONNECTION, VALUES FOR TWO TUBES‡

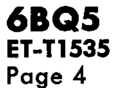
Plate Voltage	250	300	Volts
Cathode-Bias Resistor	270	270	Ohms
Peak AF Grid-to-Grid Voltage	23.4	28.2	Volts
Zero-Signal Plate Current	40	48	Milliamperes
Maximum-Signal Plate Current	43.4	52	Milliamperes
Effective Load Resistance, Plate-to-Plate	10000	10000	Ohms
Total Harmonic Distortion	2.5	2.5	Percent
Maximum-Signal Power Output	3.4	5.2	Watts

* The time required for the voltage across the heater to reach 80 percent of its rated value after applying 4 times rated heater voltage to a circuit consisting of the tube heater in series with a resistance equal to 3 times the rated heater voltage divided by the rated heater current.

† Without external shield.

‡ With screen tied to plate.





AVERAGE PLATE CHARACTERISTICS

E_f = RATED VALUE
E_{c2} = 250 VOLTS

I_b @ E_{c1} = 0 VOLTS
-2.0
-4.0
-6.0
-8.0
-10
-12

I_{c2} @ E_{c1} = 0 VOLTS
-2.0
-4.0
-6.0
-8.0
-10
-12

PLATE CURRENT (I_b) IN MILLIAMPERES
SCREEN CURRENT (I_{c2}) IN MILLIAMPERES
PLATE VOLTAGE IN VOLTS

K-55611-TD52-2

DECEMBER 17, 1958

AVERAGE TRANSFER CHARACTERISTICS

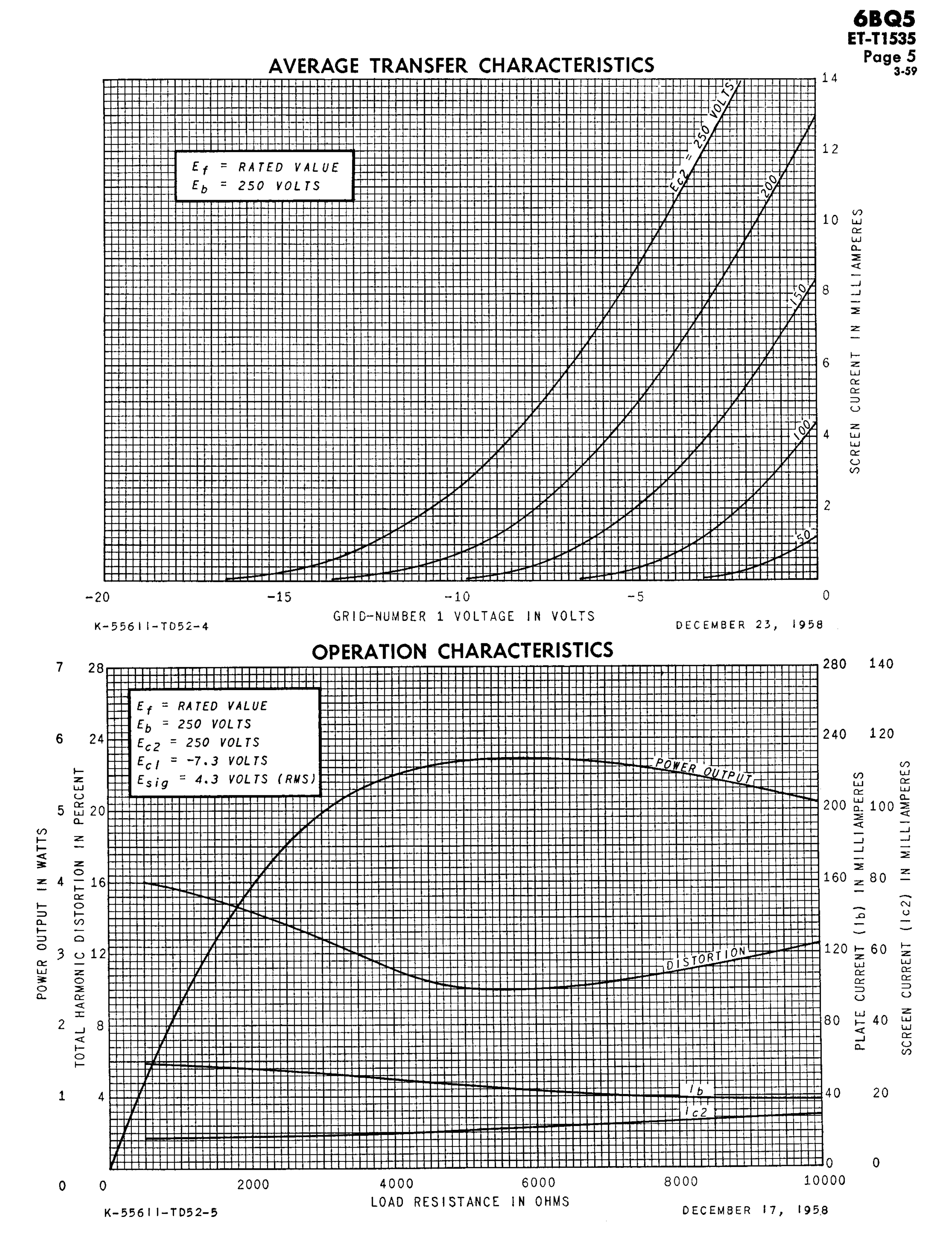
E_f = RATED VALUE
E_b = 250 VOLTS

E_{c2} = 250 VOLTS
200
150
100
50

PLATE CURRENT IN MILLIAMPERES
GRID-NUMBER 1 VOLTAGE IN VOLTS

K-55611-TD52-3

DECEMBER 23, 1958


AVERAGE TRANSFER CHARACTERISTICS
Ef = RATED VALUE
Eb = 250 VOLTS
Ec2 = 250 VOLTS
200
150
100
50
SCREEN CURRENT IN MILLIAMPERES
14
12
10
8
6
4
2
-20
-15
-10
-5
0
GRID-NUMBER 1 VOLTAGE IN VOLTS
K-55611-TD52-4
DECEMBER 23, 1958
OPERATION CHARACTERISTICS
Ef = RATED VALUE
Eb = 250 VOLTS
Ec2 = 250 VOLTS
Ec1 = -7.3 VOLTS
Esig = 4.3 VOLTS (RMS)
POWER OUTPUT
DISTORTION
Ib
Ic2
POWER OUTPUT IN WATTS
TOTAL HARMONIC DISTORTION IN PERCENT
PLATE CURRENT (Ib) IN MILLIAMPERES
SCREEN CURRENT (Ic2) IN MILLIAMPERES
7
6
5
4
3
2
1
0
28
24
20
16
12
8
4
0
280
240
200
160
120
80
40
0
140
120
100
80
60
40
20
0
2000
4000
6000
8000
10000
LOAD RESISTANCE IN OHMS
K-55611-TD52-5
DECEMBER 17, 1958

OPERATION CHARACTERISTICS

E_f = RATED VALUE
E_b = 250 VOLTS
E_{c2} = 250 VOLTS
E_{c1} = -7.3 VOLTS
R_L = 5200 OHMS

I_b
POWER OUTPUT
DISTORTION
I_{c2}

POWER OUTPUT IN WATTS: 0, 1, 2, 3, 4, 5, 6, 7
TOTAL HARMONIC DISTORTION IN PERCENT: 0, 4, 8, 12, 16, 20, 24, 28
PLATE CURRENT (I_b) IN MILLIAMPERES: 0, 10, 20, 30, 40, 50, 60, 70
SCREEN CURRENT (I_{c2}) IN MILLIAMPERES: 0, 5, 10, 15, 20, 25, 30, 35
INPUT SIGNAL IN VOLTS (RMS): 0, 1, 2, 3, 4, 5

K-55611-TD52-6 DECEMBER 17, 1958

OPERATION CHARACTERISTICS

PLATE DISSIPATION RATING
SCREEN DISSIPATION RATING
(PEAKS OF SPEECH AND MUSIC)
PLATE DISSIPATION
SCREEN DISSIPATION RATING
(CONTINUOUS)
SCREEN DISSIPATION
POWER OUTPUT
DISTORTION

TWO TUBES PUSH-PULL
CLASS AB1
E_f = RATED VALUE E_{c1} = -13 VOLTS
E_b = 300 VOLTS R_L = 6500 OHMS
E_{c2} = 300 VOLTS

TOTAL HARMONIC DISTORTION IN PERCENT: 0, 4, 8, 12, 16, 20, 24, 28
POWER OUTPUT IN WATTS: 0, 1, 2, 3, 4, 5, 6, 7
PLATE DISSIPATION IN WATTS - PER TUBE: 0, 2, 4, 6, 8, 10, 12, 14
SCREEN DISSIPATION IN WATTS - PER TUBE: 0, 1, 2, 3, 4, 5, 6, 7
PEAK INPUT SIGNAL, GRID-TO-GRID: 0, 10, 20, 30, 40

K-55611-TD52-7 DECEMBER 17, 1958

ELECTRONIC COMPONENTS DIVISION



Schenectady 5, N. Y.

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